



How Green is your Remediation?

Oregon Brownfields Conference

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Outline

- What is Green Remediation?
- Oregon Examples
- Green Remediation past, present and the future
- Can we do this now? – Yes, we can!
- Resources – DEQ, EPA, ASTSWMO, States, ITRC, SuRF



A Quick Quiz

Green Remediation is

- A. Something Captain Kirk did in a Stark Trek episode
- B. Cleaning up after a St. Patrick's Day party
- C. Making brownfields look pretty with FD&C Green #3
- D. Consideration of sustainability principles in all phases of remediation in order to maximize the net environmental benefit of a cleanup



Green Remediation

Involves

- Addressing not only hazardous substance risk, but also
- Limiting the environmental footprint of remediation:
 - Conserving natural resources
 - Improving energy efficiency
 - Minimizing waste and release of toxics
 - Minimizing release of greenhouse gases



Greener Approaches

Examples

- Using passive sampling devices for investigations
- Designing treatment systems for optimum efficiency
- Using renewable energy sources such as solar and wind
- Using alternative fuels to operate heavy machinery
- Using in situ bioremediation or phytoremediation



Evaluating Alternatives

One example

Technology	Estimated CO ₂ Emissions Annual Average (Metric Tons)
Pump & Treat	323,456
Thermal Desorption	57,756
Multi-Phase Extraction	12,000
Air Sparging	6,499
Soil Vapor Extraction	4,700

Source: *Green Remediation: Incorporating Sustainable Environmental Practices into Remediation of Contaminated Sites*, EPA, April 2008



Green Remediation

Project examples

Port of Portland Terminal 4, Removal Action

Use of ultra low sulfur diesel fuel in heavy equipment for a riverbank cleanup



Cascade Corporation, Troutdale

Phytoremediation using Poplar trees to remove volatile organic compounds from groundwater



Green Remediation

Examples

Oregon Dry Cleaner sites

Pump & treat and soil vapor extraction systems replaced by in-situ bioremediation using existing wells



ODOT Bridges

Environmental Performance Standards for demolition, construction or repair of bridges – material recycling and ecological restoration





Green Remediation

Past and Present

Back in the day, we just called it “cleanup”

Present:

- Labeling of cleanup projects as “green” or “more sustainable”
- Identifying case studies
- Incorporating life-cycle analysis and other approaches into cleanup decision-making
- Developing green remediation standards and guidance



Green Remediation

The Future?

Add green remediation to the elements of a more sustainable project:

- Green cleanup
- Brownfield redeveloped
- LEED certified building
- Deliberate, defensible evaluation of alternatives and selection of more sustainable approaches
- All phases - site assessment, remedial investigation, feasibility study, remedial design, operation and maintenance
- Change the law to include sustainability as a factor in the feasibility study for remedy selection?



But Wait, Can We do this Now?

Yes, we can!

There is nothing in Oregon's cleanup laws about being "green" or "sustainable" but,

- Green approaches may meet FS balancing factors (e.g., more implementable, less costly)
- In practice, we have considered remedial action impacts on the surrounding community (e.g., truck traffic)
- Pilot projects provide opportunity for innovation
- DEQ can approve voluntary actions that go beyond feasibility study criteria



Green Remediation Resources

Oregon DEQ

DEQ Green Remediation website:

<http://www.deq.state.or.us/lq/cu/greenremediation.htm>

- DEQ's perspective on green remediation
- Example projects
- Links to other resources



Green Remediation Resources

U.S. EPA

EPA Green Remediation web site:

<http://clu-in.org/greenremediation>

- Green Remediation Technology Primer
- Superfund Green Remediation Strategy, Public Review Version, August 2009
- ASTM Standard Guide for Green and Sustainable Site Assessment and Cleanup, expected 2011

EPA Region 10 Green Cleanups web site:

<http://yosemite.epa.gov/R10/extaff.nsf/programs/greencleanups>

- Green & Clean Policy



Green Remediation Resources

EPA and DEQ

EPA is a leader in promoting green remediation and providing guidance (Carlos Pachon, EPA Office of Superfund Remediation and Technology Innovation)

EPA Region 10 – has proposed to include green remediation policy development in the Core grant for 2010 that supports DEQ Cleanup Program work

DEQ supports green remediation and has a green remediation website, but has not prepared a formal policy statement or guidance document



Green Remediation Resources

ASTSWMO

Association of State and Territorial Solid Waste Management Officials

Greener Cleanup Task Force:

http://www.astswmo.org/resources_sustainability_greenercleanups.html

- Green Remediation “Myth Busters” fact sheet
- Incorporating Greener Cleanups into Remedy Reviews
- Links to other states



Green Remediation Resources

Other states

- California – Green Remediation Team, draft Interim Advisory for Green Remediation
- Illinois – Has an evaluation matrix and is developing a green remediation prototype for underground storage tank sites
- Massachusetts – Incorporating green cleanup concepts into contract language for state funded cleanups
- New York – Incorporating green remediation into all aspects of remediation, draft state policy on green remediation
- Wisconsin – Wisconsin Initiative for Sustainable Cleanups



Green Remediation Resources

Other groups

ITRC (Interstate Technology and Regulatory Council)

http://www.itrcweb.org/teampublic_GSR.asp

– Green and Sustainable Remediation project

SuRF (Sustainable Remediation Forum)

<http://www.sustainableremediation.org>

– White paper - *Integrating Sustainability Principles, Practices, and Metrics into Remediation Projects*



How Green is your Remediation?

Rate your project:

- Forest Green -platinum
- Kermit the Frog -gold
- Lime -silver
- Pistachio -bronze

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